



# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US99/11951

## A. CLASSIFICATION OF SUBJECT MATTER

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According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
U.S. : 235/492

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,151,684 A (Johnsen) 29 September 1992, see the abstract and figures 1-9	2-4, 5, 9, 10-11, 15, 16-19, 20, 21-22, 23- 27
Y		1, 6-8, 12, 13
Y	US 5,557,096 A (Watanabe et al.) 17 September 1996, see the abstract columns 1-14 and figures 1-2 and 19-21	1, 6-8 and 13
Y	5,914,670 A (Goodwin, III et al.) 22 June 1999, see figures 1-2	12

☐ Further documents are listed in the continuation of Box C.

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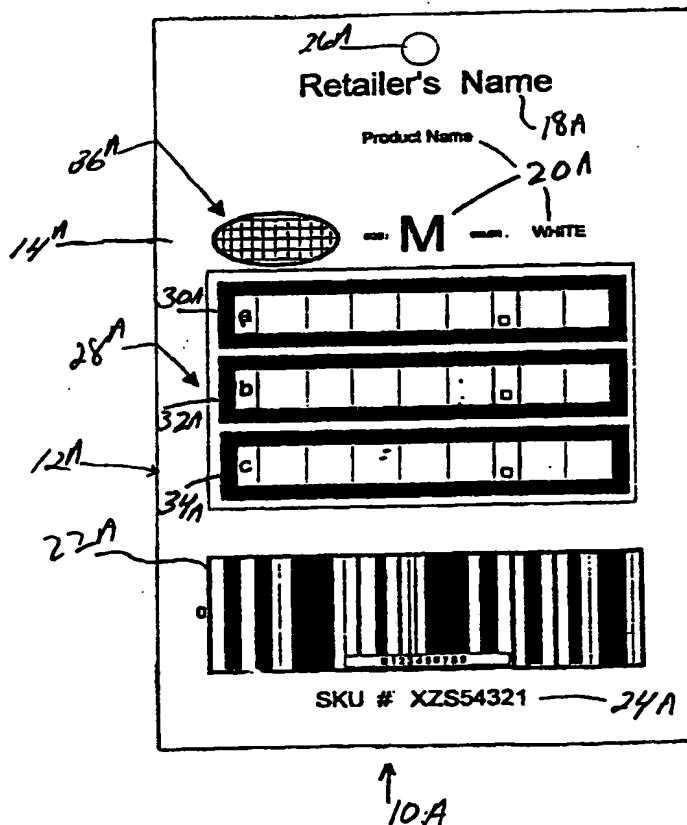
## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/US99/11951 (22) International Filing Date: 29 May 1999 (29.05.99) (30) Priority Data: 09/086,839      29 May 1998 (29.05.98)      US 09/172,694      14 October 1998 (14.10.98)      US 09/322,938      28 May 1999 (28.05.99)      US (71) Applicant: TAGCORP., INC. [US/US]; 24 Norman Place, Tenafly, NJ 07670 (US). (72) Inventor: YOKED, Yehuda; 24 Norman Place, Tenafly, NJ 07670 (US). (74) Agent: WEINGRAM, Edward, R.; Weingram & Associates, P.C., 197 West Spring Valley Avenue, P.O. Box 927, Maywood, NJ 07670 (US).			(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>Without international search report and to be republished upon receipt of that report.</i>

(54) Title: REMOTE CONTROLLED ELECTRONIC PRICE TAG

## (57) Abstract

An electronic price tag is adapted for wireless adjustment, which consists of a display placard mounted to the goods at, for example, a point of manufacture for the goods; a plurality of price display fields on the placard; a receiver/decoder horn mounted to the placard for receiving signals from a remote location and decoding same to be inputted to the price display field. Additionally, the price tag of the present invention permits the retailer to maintain in confidence and secrecy price information pertaining to the specific goods, i.e. the goods are not routed through a supplier or other third parties that would obtain knowledge of the retailer's pricing-strategy. The price tag of the present invention is also provided with a transponder to confirm receipt and acceptance of pricing information generated from the remote location so that inventory control can be conducted at a selected period of time or with respect to any price adjustment to the goods. The price display fields are electronic, such as liquid crystal display (LCDs) or electronic ink.



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5       **TITLE:**                               **REMOTE CONTROLLED ELECTRONIC PRICE TAG**  
**INVENTOR:**                               **YEHUDA YOKED**

**SPECIFICATION****CROSS-REFERENCE TO RELATED APPLICATIONS**

10       This is a continuation-in-part of Application No. 09/172,694, filed October 14, 1998, which is a continuation-in-part of Application No. 09/086,839, filed May 29, 1998.

**BACKGROUND OF THE INVENTION****FIELD OF THE INVENTION**

15       The present invention relates to electronic price display systems and more particularly, to price tags which are electronically controlled from remote locations.

**DESCRIPTION OF RELATED ART**

20       It is desirable in the retail industry to be extremely efficient when identifying and ordering goods through the various steps to the actual display of the goods and notification to the purchasing public of the price of such goods. Retailers, in particular, strive to reduce the time necessary to inventory ordered and back-ordered goods, as well as the actual sales of goods and remaining stock. In the  
25       highly competitive retail environment, every hour expended to document, inventory and display goods depletes the profits realized from sales of the goods. Retailers are particularly sensitive to the necessity of cost-effectiveness, especially when sales of products are necessary in order to turn over or  
30       clear out stock.

Usually, a retailer will order goods or products, commonly known as SKU's (stock keeping units), to be shipped from a

manufacturer or distributor. A single SKU equals one of the particular goods. The goods arrive at the retailer in bulk, enclosed with invoices, bills of lading, or other transit documents that the retailer must review, collate and cross-check to determine that the goods he will pay for have indeed been delivered. A manufacturer ships the goods without price tags. This is because the manufacturer does not know what the goods will ultimately be priced at and what the actual demand will be that will dictate the ultimate price to the purchasing public.

The retailer then affixes a label or price tag to the goods bearing indicia pertaining to the particular product and store, i.e. store name, bar code, SKU, model number, size, color, etc. The tag is usually manually affixed to the product in the store and then distributed or racked at the appropriate area of the store for sale. After a specified period of time has elapsed since the display of the goods, those goods not sold must be put on sale or marked down to attract consumers so that the stock can be moved out of the store. This requires adjusting the original price and writing thereon the sale price. This may occur more than once, perhaps even two or three times, before the SKU is actually sold.

On certain occasions, a distribution center for the retailer or similarly owned retailers will affix the price tag to the product before it is shipped to a specific store or stores. During this procedure, and the time lag for the goods tagged at the distribution center and received at the retailer, the retailers' marketing (pricing) strategy is vulnerable to access by competitors. The potential for unauthorized access to the retailer's pricing strategy is increased due to the time lag, which could prevent the retailer from being first-in-time to offer a sale of highly competitive goods.

Procedures to indicate sales involve manually affixing sales tags over the original price on the price tag to notify consumers of the sale price. Many retailers still use a person to mark down a product for a sale.

5 It is also extremely time consuming to inventory remaining stock or SKUs still on display on the selling floor. Depending upon the industry or seasonal requirements, inventory of the goods may be done on a monthly or quarterly basis, or on those occasions where vendors are dropped or added. In either of  
10 these instances, a tremendous amount of time is lost to inventory the remaining stock to determine sales of the goods, monitor theft control procedures, and other particulars of the goods to be sold.

15 In all the situations presented above, a tremendous amount of time is lost "tagging" the goods for sale and manually adjusting the price, in practically all instances downward, for the goods on sale.

Electronic display systems are known, some of which address certain of the disadvantages discussed above.

20 U.S. Patent No. 4,139,149 to Crepeau et al discloses a computer controller connected to a series of hard wired display units.

25 U.S. Patent No. 4,500,880 to Gomersall et al discloses a series of remote displays actuated by a computer but does not show individual price tags. Rather it shows pricing displays mounted on the edge of a shelf.

U.S. Patent No. 4,727,368 to Larson et al discloses a series of remote lock boxes controlled by a central computer through radio frequencies and/or telephone lines.

U.S. Patent No. 4,888,709 to Revesz et al discloses what appears to be a radio transmitted series of signals directed to remote displays located on shelves to control the pricing on the remote display.

5 U.S. Patent No. 5,019,811 to Olson et al discloses a series of remote display units directed from a central system. The display units could not be used for individual price tags.

U.S. Patent No. 5,121,563 to Connor et al discloses a display device useful for mounting cards or other items.

10 U.S. Patent No. 5,572,653 to DeTemple et al discloses a hard wired grid controlled from a central source having a plurality of stations which then send infrared signals to display units or can be used to receive information from shopping carts and the like to indicate shoppers habits.

15 U.S. Patent No. 5,715,622 to Giordano, Jr. discloses a shelf mounted display that receives radio frequency information by means of an antenna 24 and then displays the information on a display unit 22. This system is also intended for mounting on shelves.

20 However, among the known devices and systems, there still remains the inefficient task of mounting the price or display tag for the goods to the item for sale. The inefficient requirement of having to indicate price reductions manually on a price tag is still not addressed by the inventions above.

25 The above devices and systems do not display the sale price directly on the product in an electronic display being remotely controlled. Therefore, removal of a product or products from a specific rack or shelf area indicating the sale



price of goods will leave purchasers confused as to the actual sale price of the goods.

5 The above devices and systems also do not permit consumers to view an item on sale displaying the original price and repetitive markdowns, so that the consumer will be encouraged to purchase the goods on sale.

10 It is therefore desirable to have the SKU's arrive at the retail establishment already having a price tag mounted thereto to reduce substantially the time required to process incoming goods and display same to the purchasing public. This, of course, as mentioned above, impacts tremendously on the merchants profits. The ability of a retailer to be able to handle incoming goods which already have price tags attached, coupled with being able to immediately display the goods  
15 without any further effort by the retailer and then to electronically adjust the price of the goods from a remote location so that the consumer sees the successive price adjustments with the goods, is highly advantageous both for its cost-effectiveness and maintaining a good rapport with  
20 consumers.

It is also desirable to have a system which can facilitate inventory control of the goods, and which acknowledges/confirms that price adjustments at the goods have been received, accepted and displayed.

#### 25 BRIEF SUMMARY AND OBJECTS OF THE INVENTION

To overcome the disadvantages of known price tag devices and systems in the retail environment, there is provided an electronic price tag adapted for wireless adjustment, which consists of a display panel mounted directly to the product at  
30 the point of manufacture or at any point in the chain of commerce up to the actual location of retail sales; a plurality

Additionally, the electronic price tag of the present invention permits the retailer to maintain in confidence and secrecy price information pertaining to the specific goods, i.e. the goods do not have to be routed through a supplier or other third parties that would affix the price tags to the manufactured items and have knowledge of pricing strategy. The price tag of the present invention substantially reduces, if not eliminates, the undesirable aspect of providing competitors with a way to obtain information regarding the price of particular goods prior to putting the goods on sale. Therefore, a sale price or the lowest price for the goods can be displayed at the last possible moment.

An additional feature also calls for the elements of the price tag being constructed and arranged as a composite unit.

A still further feature calls for the electronic elements of the price tag according to the present invention being constructed and arranged as a composite unit which is set into a placard or platform of the price tag.

It is an object of the present invention to provide a price tag which is mounted to the goods for sale at point of manufacture for the goods.

5 It is another object of the present invention to provide an electronic price tag having a plurality of price display fields wirelessly adjustable from a remote location.

10 It is another object of the present invention to provide electronic display fields on a price tag which is constructed and arranged as a composite unit immediately mountable to goods at a point of manufacture for the goods.

15 It is another object of the present invention to provide a price display tag mounted to the goods at the point of manufacture capable of displaying the price, in addition to display retail indicia, such as the retailer's name, product name, size, color, bar code, etc.

It is another object of the present invention to provide a price tag which substantially reduces the amount of time necessary to document and inventory goods received by the retailer from the manufacturer.

20 It is another object of the present invention to provide a price tag which substantially reduces the amount of time necessary to adjust the price tag to indicate price changes for the goods.

25 It is an object of the present invention to provide a price tag which develops customer loyalty by showing the successive price changes of the goods.

It is an object of the present invention to provide a price tag which is easy to manufacture.

It is an object of the present invention to provide a price tag which is usable in all retail environments with all types of goods.

5 It is an object of the present invention to provide a price tag which can be chemically fastened to packaging for goods at point of manufacture.

10 It is an object of the present invention to provide a price tag which responds to signals from radio frequencies, microwaves or other wavelengths which are actuated by computer software at a remote location.

It is an object of the present invention to provide a price tag which permits the retailer to monitor sales and adjust marketing strategy in response to said sales without having to manually adjust each tag.

15 It is an object of the present invention to provide a price tag and a system therefor which can transmit necessary pricing data to all relevant merchandise.

20 It is an object of the present invention to provide an electronic price tag and system therefor which can be manipulated from the retailer's warehouse distribution center to signal the individual price tag at the remote retail locations and notify the individual retailers that such price manipulation has occurred.

25 It is an object of the present invention to provide an electronic price tag which is cheap enough to be disposable, but which can also be reused by replacing a battery.

It is an object of the present invention to provide an electronic price tag which can be programmed to lock in the lowest price for the product to comply with fair market sales.

5 It is an object of the present invention to provide an electronic price tag which permits pricing of the product to be completed upon first receiving the product at the retail site.

It is an object of the present invention to provide an electronic price tag that will be accepted by those retailers demanding SKU's be "pre-priced" or "pre-tagged".

10 It is an object of the present invention to provide an electronic price tag which would prevent unauthorized switching of the prices for the product.

15 It is an object of the present invention to provide a price tag which has a replaceable power means such as a battery pack.

It is an object of the present invention to provide a price tag which is of a construction sufficient to withstand shipment with the goods over great distances.

20 It is an object of the present invention to provide a price tag which can be constructed of, for example, paper board, cardboard, or plastics.

It is an object of the present invention to provide a price tag which is easily removed from the goods after the goods have been purchased.

25 It is an object of the present invention to provide a price tag which is also adapted for being mounted to containers for goods at the point of manufacture for the goods.

It is an object of the present invention to provide a price tag which is easy and inexpensive to manufacture.

5 It is an object of the present invention to provide a price tag which includes a transponder having a passive circuit to substantially reduce, if not eliminate, energy requirements for transceiving data and operational prompts.

It is an object of the present invention to provide a price tag which can transfer radiated energy received to actuate circuitry for the price tag.

10 It is an object of the present invention to provide a price tag to transmit confirmation signals to a point of origin for the signals that same has been received and accepted for action thereon to effect pricing schedules.

15 It is an object of the present invention to provide a price tag which can be used from a remote location to monitor inventory control over any period of time selected.

It is another object of the present invention to provide electronic display fields which can include liquid crystal displays (LCDs) or electronic ink.

20 BRIEF DESCRIPTION OF THE DRAWINGS

For a more complete understanding of the present invention, reference may be had to the following detailed description of the invention taken in conjunction with the drawings herein, of which:

25 FIG. 1 is a front plan view of a first embodiment of an electric price tag according to the present invention;

FIG. 2 is a side view of the electronic price tag shown in FIG. 1;

FIG. 3 is a front plan view of a second embodiment of an electronic price tag according to the present invention;

5        FIG. 4 is a side plan view of the electronic price tag shown in FIG. 3;

FIG. 5 is side view of a third embodiment of an electronic price tag according to the present invention;

10       FIG. 6 is a block diagram of elements used in the electronic price tag of the present invention;

FIG. 7 is a system block diagram of the operation of the electronic price tag of the present invention;

FIG. 8 is a flow chart of a method using the electronic price tag according to the present invention;

15       FIG. 9A is a system block diagram of another embodiment of the operation of the electronic price tag according to the present invention;

20       FIG. 9B is a flow chart of another embodiment of a method using the electronic price tag according to the present invention; and

FIG. 10 is a diagram of a known system used to control electronic ink for electronic regions and displays in the present invention.

## DETAILED DESCRIPTION OF THE INVENTION

FIGS. 1-5 disclose embodiments of an electronic price tag which is affixed to goods at point of manufacture. The price tag according to the present invention is shown in FIGS. 1 and 2 generally as 10A; in FIGS. 3 and 4 generally as 10B, and in FIG. 5 generally as 10C.

In FIGS. 1 and 2, the first embodiment of the price tag 10A is shown. The price tag 10A includes a panel or platform 12A of non-conductive material. The material can be made of paper board, cardboard or polymers such as plastic, but does not have to be limited to these materials. It is preferred that the material is of a non-conductive nature so as not to interfere with the transmission and receipt of signals at the price tag 10A. Some flexibility of the panel 10A is preferred.

The panel 12A includes a front or display surface 14A, and a back surface 16A. The front surface 14A is conducive to receiving printed indicia thereon such as identifying indicia for the retailer's name 18A, product particulars 20A such as size and color, and a bar code 22A; and a stock keeping unit (SKU) number 24A.

An aperture 26A extends completely through the panel 12A to facilitate attaching the price tag 10A to the product at the point of manufacture.

The panel 12A can be of any size, shape or color to meet the needs of the product to be sold in the retail environment.

An electronic display region 28A is disposed on the front surface 14A of the panel 12A. The electronic display region 28A includes display fields 30A, 32A, 34A (30A-34A). The display fields are preferably liquid crystal display elements (LCDs) although other electronic displays can be used. The



fields 30A-34A are electronically connected for separable operation or in conjunction with each other. The display fields 30A-34A are manipulated from a remote location to display a single price or succession of prices for the goods to which the price tag 12A is attached.

A receiver-decoder horn 36A is mounted to the front surface 14A of the panel 12A. The horn 36A receives wireless signals generated from a remote location and decodes the signals to be displayed in the fields 30A-34A of the display region 28A.

A battery pack 38A is mounted to the back surface 16A of the panel 12A to provide power for the horn 36A and the display fields 30A-34A of the display region 28A. The battery employed with the pack can be of the type which is replaceable or it can be disposable along with the rest of the price tag 10A.

The arrangement of the display region 28A, the horn 36A, and the battery pack 38A with respect to the panel 12A is such that these elements can be chemically fastened or press fit to the panel 12A.

The aperture 26A extending through the panel 12A is designed to, for example, receive a plastic lanyard (not shown) to be attached to the goods at the point of manufacture.

FIGS. 3-4 disclose a second embodiment of the price tag 10B of the present invention. Elements for the second embodiment shown in FIGS. 3-4 which are the same as those elements referred to in FIGS. 1 and 2, are referred to by the same reference numeral including the capital letter "B". Elements in FIGS. 3-4 which corresponds to the same elements in FIGS. 1-2 operate the same unless otherwise indicated.

5 This embodiment can be chemically fastened to the products  
at point of manufacture, or the containers in which the  
products are shipped from point of manufacture. The battery  
pack 38B is mounted to the back 16B of the panel 12B in the  
manner described with reference to the first embodiment of  
10 FIGS. 1 and 2. However, in this embodiment, a sheet of  
adhesive 40 is provided to sandwich the battery pack 38B  
between the adhesive sheet 40 and the panel 12B. This is  
accomplished by having a front adhesive surface 42 of the  
15 adhesive sheet 40 pressed against the back 16B of the panel 12B  
to hold the battery pack 38B securely to the back surface 16B  
of the panel 12B.

20 In a preferred embodiment, a back surface 44 of the  
adhesive sheet 40 is also provided with an adhesive to  
chemically fasten the price tag 10B to the product at point of  
manufacture.

25 Another preferred embodiment includes the adhesive sheet  
40 having an elongated channel 46 or groove sized and shaped to  
receive the battery pack 38B therein. In this manner of  
construction, when the front surface 42 of the adhesive sheet  
40 is adhered to the back 16B of the panel 12B, there is  
30 presented a uniform and streamlined appearance of the back  
surface 44 of the sheet 40.

35 In FIG. 5, still another embodiment of the electronic  
price tag according to the present invention is shown generally  
at 10C. In this manner of construction, elements which are the  
same as those shown with respect to the embodiment FIGS. 1-2  
have the same reference number and include the letter "C". All  
elements operate the same unless otherwise indicated.

30 In the embodiment shown in FIG. 5, the placard or panel  
for the price tag is shown generally at 12C. An electronic

display unit 50 consists of an LCD display region 28C, a receiver-decoder horn 36C and a battery pack 38C. Electronics for the display unit 50 are shown generally at 52. The display unit 50 is formed as an integral unit which is, for example, press fit into or sandwiched between a plurality of layers 54, 56 of the panel 12C. Other methods to mount the display unit 50 to the panel 12C can be employed.

Referring to FIGS. 6-7, a diagram 60 (FIG. 6) is shown for operation of the price tag 10A-10C of the present invention. The block diagram 60 pertains to all of the embodiments shown with respect to FIGS. 1-5. All of the elements in the schematic shown in FIG. 6 form part of the electronic price tag 10A-10C. By way of example only, reference numerals will be those used in association with the first embodiment shown in FIGS. 1-2.

At a remote location either in the retail store or at a distribution center for the retail store, manual input 62 shown in FIG. 7, is keyed into a central processing unit (CPU) 64 to store price data for later availability and manipulation. The digital data in the CPU 64 can then be processed by a signal processor into analog data for wireless transmission by a transmitter 66 to one of the embodiments of the electronic price tag 10A-10C. The wireless transmission 68 can be implemented by radio waves, microwaves, etc. In the cluttered environment of a retail store and large warehouses, line of sight wireless transmissions do not provide the necessary reliability, although they can be used to a certain extent.

The wireless analog data in the signal 68 is received by the horn 36A of the electronic price tag 10A. The horn includes an exciter 70, shown in FIGS. 6 and 7, including an antenna and a filter which insures that only those wireless signals specific to the electronic price tag will be received.

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"lock-in" this price, and no further adjustments to the price will be permitted.

Another embodiment of the price tag according to the present invention calls for use of a transponder 77 in combination with battery pack 38A as shown in FIG. 6. The transponder is adapted to receive coded signals pertaining to the SKUs and corresponding prices, as well as transmit its own coded signal back to the remote location confirming that instructions and prompts have been received and accepted for display at the price tag. This embodiment also communicates data encoded pertaining to the inventory remaining of the SKUs.

And still a further embodiment of the price tag according to the present invention while also referring to FIG. 6, is that the price tag can include the transponder having a passive circuit. Examples of such circuits may be found in systems such as employed in automated highway toll collection passes, and cards having embedded circuits used for banking transactions.

A typical transponder passive circuit may utilize a miniaturized antenna element receiving a radio frequency signal from a closely located source. The received signal passes through a tuning circuit and is converted to a direct current signal by a diode and resistor-capacitor network to activate the local digital display. The resultant local signal is also sufficiently strong for the transponder to generate a return signal back to the source.

In this manner of construction, the price tag is adapted to receive and accept specific prompts and signal an encoded format confirmation of said prompts without use of battery power. This passive circuit assembly provides for a less expensive tag in that the energy requirements are substantially

reduced, if not eliminated. This embodiment is also adapted to confirm receipt of the encoded signals to the price tag and to generate the confirmation signal in encoded format.

5 In FIG. 8, a flow chart is provided of a method according to the present invention. As discussed above, the cost-effectiveness of the method for the present invention derives from attaching electronic price tags to goods at their point of manufacture.

10 The first procedure in the method according to the present invention is forming 90 the tag to be attached to goods. The construction of the tag includes printing 92 retailer and product information on a surface of the electronic price tag. This information, including entering 94 information about the  
15 price, is done during the construction of the tag and may include the I.D. firmware 74 element as discussed above with respect to FIG. 6. The tag is then attached 96 to the specific product or SKU, after which the SKU or a plurality of the SKU's are packaged 98 for shipment 100 to a main distribution center  
20 for a retailer, or directly to the retailer.

At the distribution center for the retail store or the retail store, the package is received 110, where the package is staged 116 for unpackaging 118 prior to racking 120 of the SKU's. Immediately upon receiving 110 the package having the  
25 SKU or SKU's therein, the retailer has the option to enter the price 112 or adjust the price 114 of the SKU's from a remote location, such as a control office of the retailer. This may be necessary due to the unusually long period of time the packaging was in transit 100, or perhaps supply/demand of the  
30 product has been affected, thereby warranting a price change. The price entry 112 and adjustment 114 can be implemented immediately upon receiving 110 the package, i.e. the retailer does not have to remove the products from the packaging.

After it has been determined that the price does not require adjustment or the necessary price adjustment has been made, the packages are staged 116 for unpacking 118. During the staging 116 and unpacking 118 steps, and even after  
5 unpacking 118 of the products, the retailer can still manipulate the price as necessary.

Thereafter the products are racked 120, i.e. physically moved to the display racks or shelves in the retail establishment whereupon the consumers will review the products  
10 for sale.

Each one of the products for sale has attached to it its own individual electronic price tag which, now in the display aisle, can have its particular price adjusted. This is beneficial in that the same type of product may arrive over a  
15 period of time, for example, six months, and it may be desirable to move the earlier shipped inventory under a sales program earlier than the inventory which has arrived more recently. In that regard, the retailer can again, while the product is on the shelf, enter 122 the particular price for the  
20 product from the control room of the retail establishment and transmit 124 the price to that particular product for sale. The price is received 126 by the electronic price tag for a particular product and immediately thereafter displays 128 that price selected by the retailer and transmitted from the remote  
25 location in the retail establishment.

It is understood that the central distribution site for the retail store or the chain of stores can also implement this sort of transmission to manipulate the prices of the goods.

After the particular product has been on the shelf for an  
30 amount of time deemed unusually long by the retailer, the retailer merely has to go to the control room and adjust 130

the price of the particular product that needs to be adjusted downward. The adjusted price is transmitted 132 to a specific one of the electronic price tags where it is received 134 and displayed 136 on the electronic price tag attached to the product that is to be on sale.

The retailer and the central distribution site for the retailer if one is used, can monitor 138 sales activity of the particular product at the reduced price. If it is determined that the price is still not low enough, the procedure begins all over again with the price being adjusted 130 for transmission 132 to the product. This procedure continues until the product is sold 140.

In certain industries, fair market pricing applies. In such a market, the manufacturer or controller of the product sale price under a contract with the retailer, will not permit the product to be sold beneath a certain price. If this is the case, the electronic price tag 10A-10C can be encoded so that the price tag locks at a certain preset price, thereby assuring the retailer that he will not sell the product below the fair market price and breach his contract and the good will that has developed with the manufacturer of the goods.

As the prices are adjusted to sell the product, each earlier price under which the product was offered is still displayed. Any number of price display fields can be manufactured into the electronic price tag as needed by the retailer.

The electronic price tag can have a multiplicity of electronic price display fields 30A-34A which consumers will see to determine the successive markdowns on the products.



In addition, pricing data can be stored and generated automatically at select periods of time throughout the week, month or whatever time period is designated by the retailer, so that there is an orderly procession of price reduction for goods that remain on the selling floor for an unusual period of time.

This construction provides for the additional benefit of inventory monitoring and control of stock remaining on the selling floor. The store owner can also specifically monitor the remaining inventory after particular price reductions have been transmitted to the tag and displayed thereon for purchasers. The time interval for doing inventory of the remaining stock can be at any select interval, once every month, quarterly, etc. In addition, the central facility can be programmed so that inventory control is automatically

conducted after an elapsed amount of time or within a certain time period after a price adjustment has been transmitted to and displayed at the tag.

5       FIG. 9B, taken in conjunction with FIG. 9A, shows a flow  
chart provided for the method for another embodiment according  
to the present invention. In this embodiment, all the steps  
are discussed with respect to FIG. 8, and are essentially the  
same. However, there is now provided the additional steps of  
10       confirming the receipt and acceptance 135 of the pricing  
information at the tag so that the central facility is assured  
that their transmissions are being complied with. There is  
also the automatic monitoring and calculation of inventory 138  
on the remaining stock on the selling floor. This step of  
inventory control can be automatically conducted with respect  
15       to the amount of time which has elapsed since the last  
inventory of goods, or the amount of time which has elapsed  
since the price adjustment at the tag for the goods.

Electronic ink can also be used, in lieu of LCDS, for the  
electronic display of the present invention. FIG. 10 discloses  
20       a known structure for use in the electronic display in regions  
28A (FIGS. 1,6), 28B (FIG. 3) and 28C (FIG. 5); and in the  
display fields 30A-34A and 30B-34B. These electronic displays  
include electronic ink, which includes encasing microscopic  
particles 142 (such as a two-colored dipole particle) within  
25       tiny transparent capsules 144 laid out in an array on the tag.  
The capsules 144 have a fluid-filled layer 146. The spherical  
particles 142 used are preferably black and positively charged  
on one side, and white and negatively charged on the other.

30       Applying an electric field to an individual capsule 144  
rotates the enclosed particle 142 and brings its white side to  
stick at the top of the microcapsule. An opposite electric  
field rotates the particle to the black side and pushes it to

stick at the bottom. No additional power is required to keep the particle in position and, hence, maintain an image for the electronic display.

5 A preferred known construction includes a transparent layer 148 printed with a web of digital signal-processing microcircuitry to control a lower layer 150 of electronic-ink microcapsules.

10 Other materials are known for use in the electronic ink feature for the invention. In particular, a protein molecule known as bacteriorhodopsin. This protein molecule is found in a purple cell membrane of bacterium called halobacterium salinarium. Illuminating the protein triggers a photochemical reaction cycle, which transports protons along a channel spanning the cell membrane. The membranes purple color comes from a bacteriorhodopsin component called retinal, which is 15 strongly bound to an aminoacid inside the membrane channel. Unbound retinal in solution is pale yellow. Alternating laser light of two different wavelengths on the protein molecule can switch it back and forth between its purple and yellow forms.

20 A thin film of bacteriorhodopsin can also change its color in response to an external electric field. Sandwiching such a protein film between transparent plates that incorporate a large number of electrodes can produce a display. By applying appropriate voltages to different parts of the film, it is 25 possible to write a page of text or place an image on the screen.

Electronic ink that can be printed onto paper and other flexible surfaces is also preferred for use with the price tag of the present invention.

It will be understood that the embodiments described herein are merely exemplary and that a person skilled in the art may make many variations and modifications without departing from the spirit and scope of the invention. All such  
5 modifications and variations of the invention are intended to be included in the scope of the appended claims.

## CLAIMS

## WHAT IS CLAIMED IS:

1. An electronic price tag adjustable by a wireless signal from a remote location, comprising:

5 a support platform having:

a front surface,

a back surface, and

10 an attachment means associated with the support platform to mount the support platform to a product at a point of manufacture/distribution for the product;

an electronic adjustment assembly mounted to the support platform having:

an antenna for receiving the wireless signal;

15 a filter connected to the antenna to filter out wireless signals to which the electronic price tag is non-responsive and to pass signals containing price information;

20 a decoder connected to the filter to identify a product code in the signal corresponding to encoded data in the decoder;

a stand by element interconnecting the filter and the decoder for determining whether to provide an actuating signal to the price tag sufficient to adjust the price of the product;

a transponder for receiving the signal and generating a responsive signal;

a signal processor connected to the decoder for converting data in the wireless signal to digital data;

5 a central processing unit (CPU) connected to the signal processor for processing said digital data;

a plurality of drive elements connected to the CPU for application of said digital data;

10 an electronic display region for the plurality of drivers mounted to the front surface of the support platform, the electronic display region having:

15 an electronic display selected from the group consisting of liquid crystal displays (LCDs) and electronic ink, the display connected to respective ones of said driver elements to be activated thereby for displaying price information for the product;

20 a battery pack mounted to the back surface of the support platform, the battery pack connected to the electronic adjustment assembly at the support platform for powering the electronic price tag to display the price information; and

printed indicia displayed at the front surface of the support platform pertaining to a retailer, product name and bar code information.

2. An electronic price tag adjustable from a remote location, comprising:

5 support means for attachment to a product at a point of manufacture/distribution for the product for which the electronic price tag is associated;

electronic indicia display means mounted on the support means for displaying adjustable pricing information about a product;

10 transponder means mounted to the support means for receiving said pricing information and generating a signal confirming acceptance of said pricing information to the remote location; and

15 power supply means mounted on the support means for supplying power to the electronic indicia display means and the transponder means.

3. The electronic price tag according to Claim 2, wherein the electronic indicia display means further comprises:

20 means for processing said remotely transmitted pricing signals and selecting only signals associated with the specific product, said processing means actuating said electronic indicia display means for displaying said adjustable pricing information.

4. The electronic price tag according to Claim 3, further comprising:

25 stand-by means for applying remotely transmitted signals to actuate said processing means only for signals associated with the specific product.

5. The electronic price tag according to claim 2, wherein said electronic indicia display means includes a plurality of LCDs for displaying adjustable pricing information.

5 6. The electronic price tag according to Claim 2, wherein the support means comprises:

a panel of non-conductive material.

7. The electronic price tag according to Claim 2, wherein the support means further comprises:

10 an aperture extending therethrough for receiving a strap for attachment to the product.

8. The electronic price tag according to Claim 2, wherein the support means further comprises:

adhesive at an exterior surface of the support means for attaching the support means to the product.

15 9. The electronic price according to Claim 2, wherein the electronic display means and the power means are formed as a composite unit adapted for being mounted to the support means.

10. The electronic price tag according to Claim 2, wherein the electronic indicia display means comprises:

20 an electronic ink display.

11. The electronic price tag according to Claim 10, wherein the electronic ink display comprises:



a region with a plurality of electronic ink display elements for displaying successive changes in pricing information.

5 12. The electronic price tag according to Claim 2, further comprising:

printed indicia displayed on a surface of the support means, the printed indicia identifying a retailer, the product, and characteristics of the product to which the support means is attached.

10 13. The electronic price tag according to Claim 2, further comprising:

a sheet of adhesive material mounted to a surface of the support means to sandwich the power supply means between the material sheet and the support means.

15 14. The electronic price according to Claim 2, further comprising:

20 a longitudinal member having a recess formed therein for receiving the power supply means, the longitudinal member constructed and arranged for being mounted to a surface of the support means for sandwiching the power supply means between the longitudinal member and the support means surface opposite to a surface to which the electronic indicia display means is mounted on the support means.

25 15. The electronic price tag according Claim 2, wherein the electronic indicia display means and the power supply means are formed as a composite unit, and the support means comprises:

a cavity formed therein for receiving the composite unit.

16. A device for displaying adjustable pricing information on a product, comprising:

5 an electronic price tag having electronic indicia display means mounted on a product for displaying adjustable pricing information on said product;

support means for attachment of said price tag to said product; and

10 signal generating means at a remote location for transmitting signals containing adjustable pricing information to said electronic price tag for display of said pricing information on said product,

15 said price tag including transponder means for receiving and applying said pricing information to said electronic indicia display means and generating a return signal to the remote location confirming receipt and acceptance of said pricing information,

20 said signal generating means supplying a signal of sufficient power to said transponder means to cause said transponder means signal to be received at said remote location without requiring an additional source of power at said price tag.

25 17. The device of claim 16, wherein said price tag includes means for processing said pricing information signals and selecting only signals associated with the specific product, said processing means actuating said electronic indicia display means for displaying said adjustable pricing information.

18. The device of claim 16, wherein said electronic indicia display means is selected from the group consisting of electronic ink and LCDs.

19. The device of claim 17 further comprising:

5           stand-by means for applying said pricing information signals to actuate said processing means only for signals associated with the specific product.

10          20. A method for associating an electronic price tag with a particular product and adjusting a price for the product, the method comprising the steps of:

          forming the electronic price tag;

          printing indicia on the electronic price tag identifying a retailer and product information;

15          entering price information into an electronic storage assembly of an electronic price tag;

          attaching the electronic price tag to the product;

          packaging the product for shipment;

          shipping the packaged product;

20          receiving the packaged product at a destination for sale of the product;

          staging the packaged product at the sale establishment;

          distributing the packaged product to a specific location;

entering price information regarding the product at a remote source;

transmitting the price information to the electronic price tag attached to the product;

5 receiving the price information at the electronic price tag from the remote source;

decoding the price information;

confirming receipt of the price information to the remote source;

10 displaying the pricing information electronically by a device including electronic display indicia selected from the group consisting of electronic ink and LCDs, on the electronic price tags;

removing the product from the packaging;

15 racking the product at a specific location for access by purchasers;

adjusting the price information for the product at the remote source;

20 transmitting the adjusted price information from the remote source to the electronic price tag;

receiving the adjusted price information at the electronic price tag;

displaying the adjusted price information by electronic ink on the electronic price tag; and

monitoring a period of time the product remains racked at the adjusted price.

21. A method for displaying a price for a product, the method comprising the steps of:

5           attaching an electronic price tag to a product at a point of manufacture/distribution;

          displaying the product for sale having the electronic price tag attached thereto; and

10           adjusting an electronic price display region of the electronic price tag from a remote location.

22. The method according to Claim 21, further comprising the step of:

          confirming adjustment of the electronic price display region to the remote location.

15           23. The method according to Claim 21, further comprising the step of:

          further adjusting the electronic price display region after an elapsed period of time to display a subsequent price for the product.

20           24. The method according to Claim 22, wherein the subsequent price of the product is displayed concurrently with an original price of the product in the electronic price display region.

25. The method according to Claim 23, further comprising the step of:

monitoring a period of time that the product remains at the adjusted price for determining whether a further adjustment will occur for the price of the product.

5 26. The method according to claim 23, further comprising the step of:

monitoring the sales and inventory of the products having said attached price tags.

10 27. The method according to claim 21, wherein the electronic price display region includes displays selected from the group consisting of LCDs and electronic ink.

FIG. 1

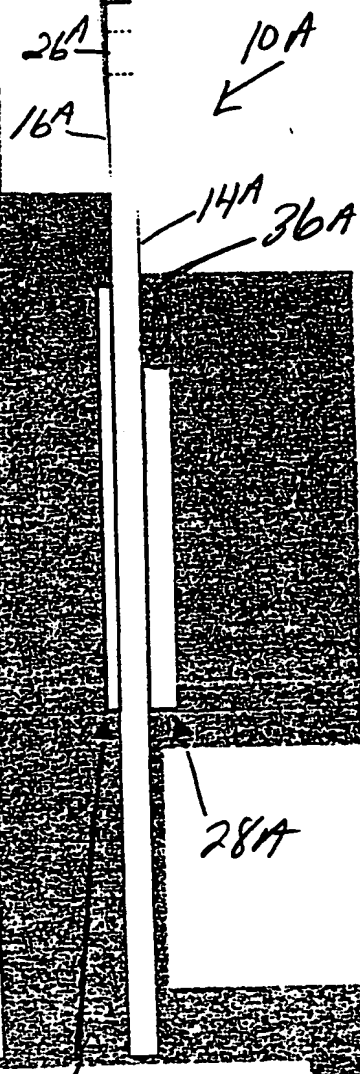
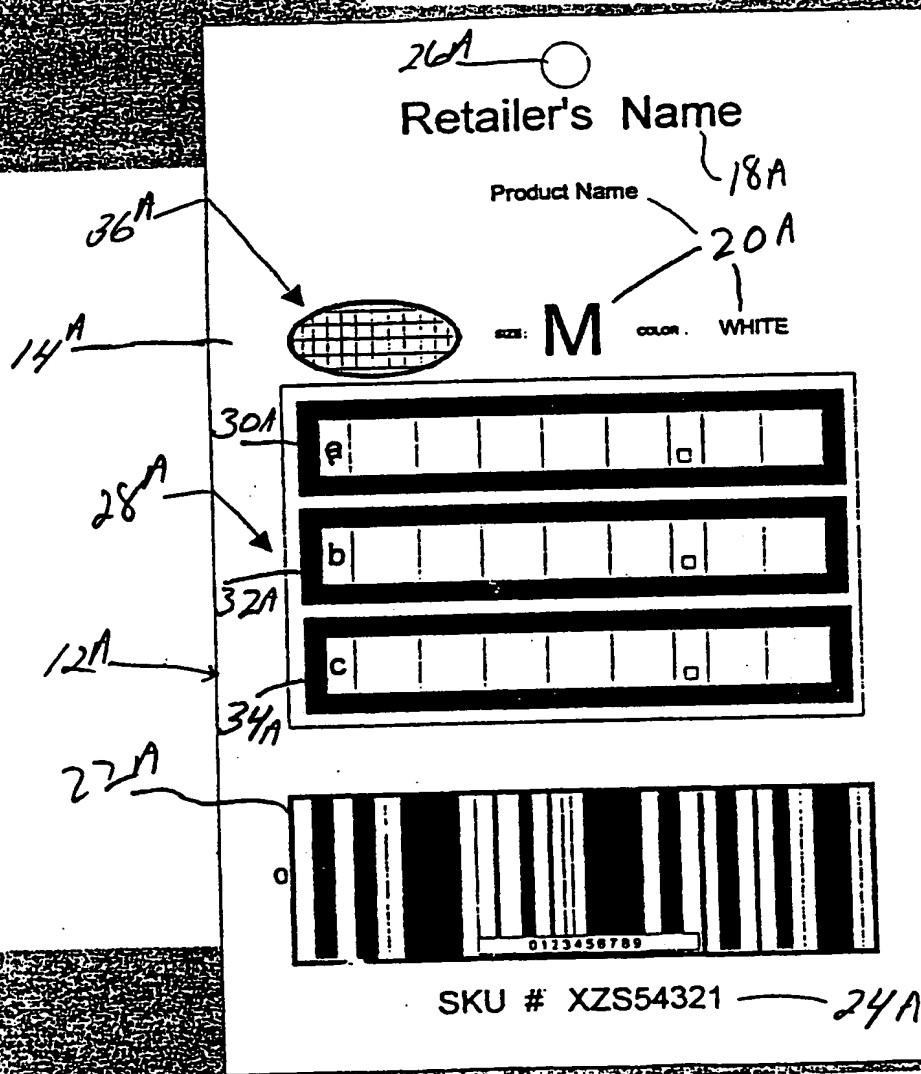
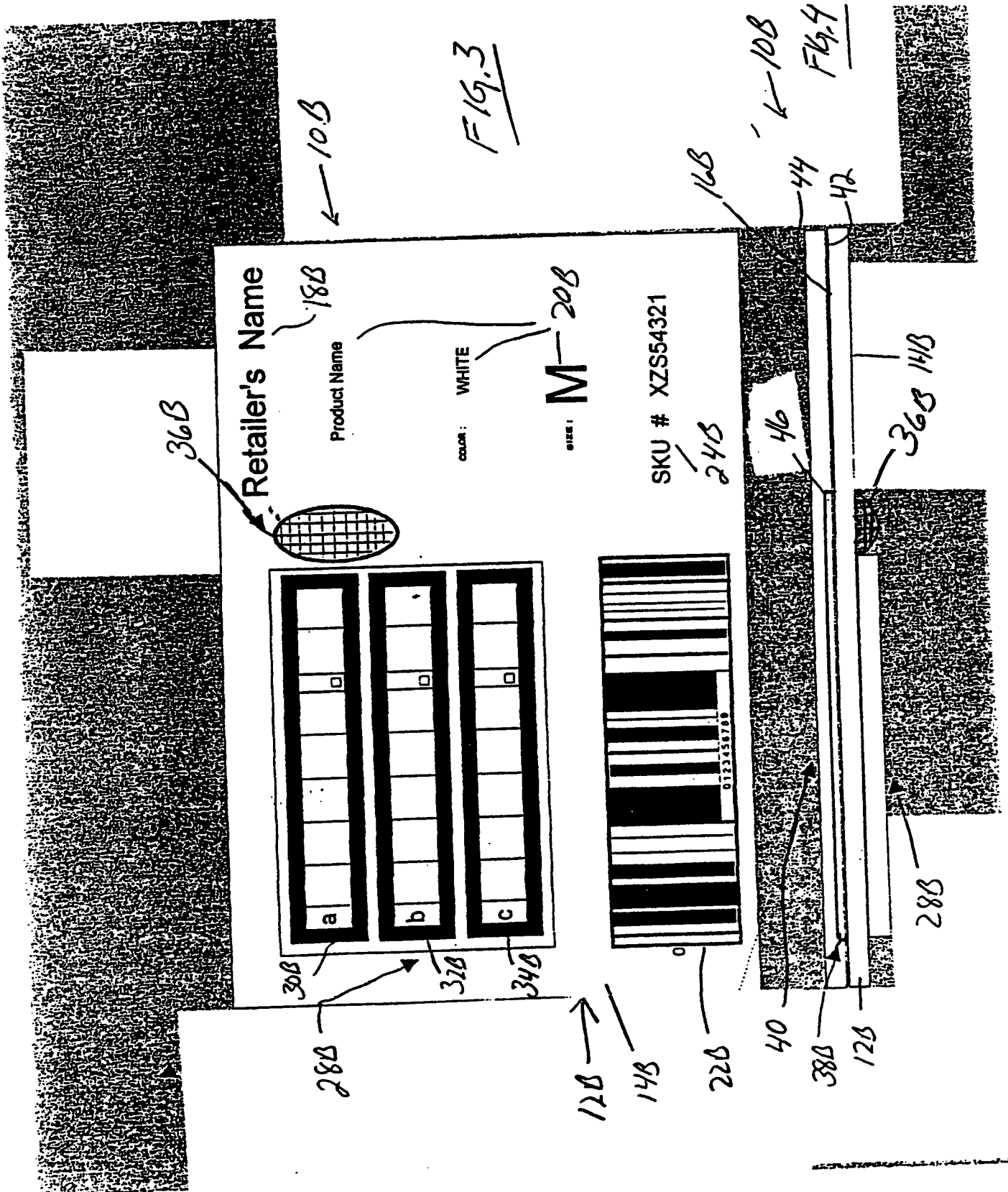


FIG. 2





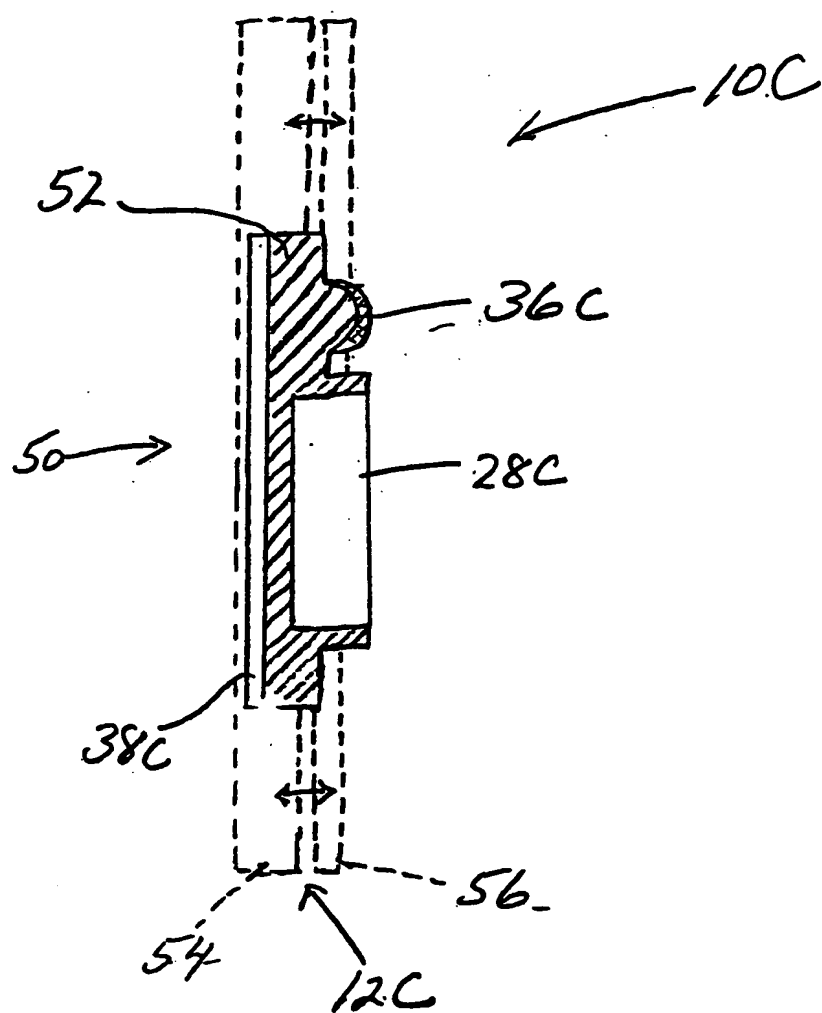


FIG. 5

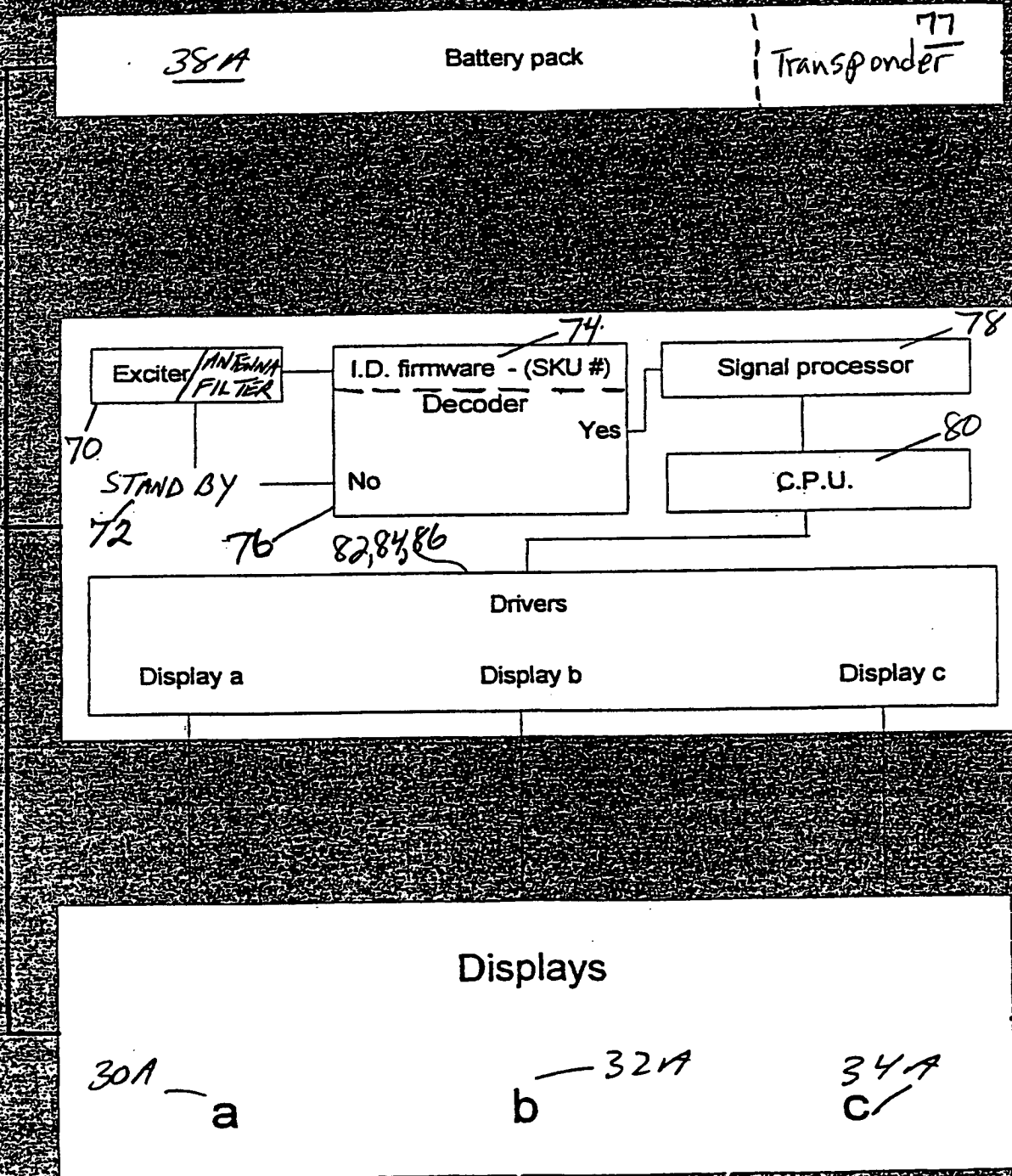


FIG. 6

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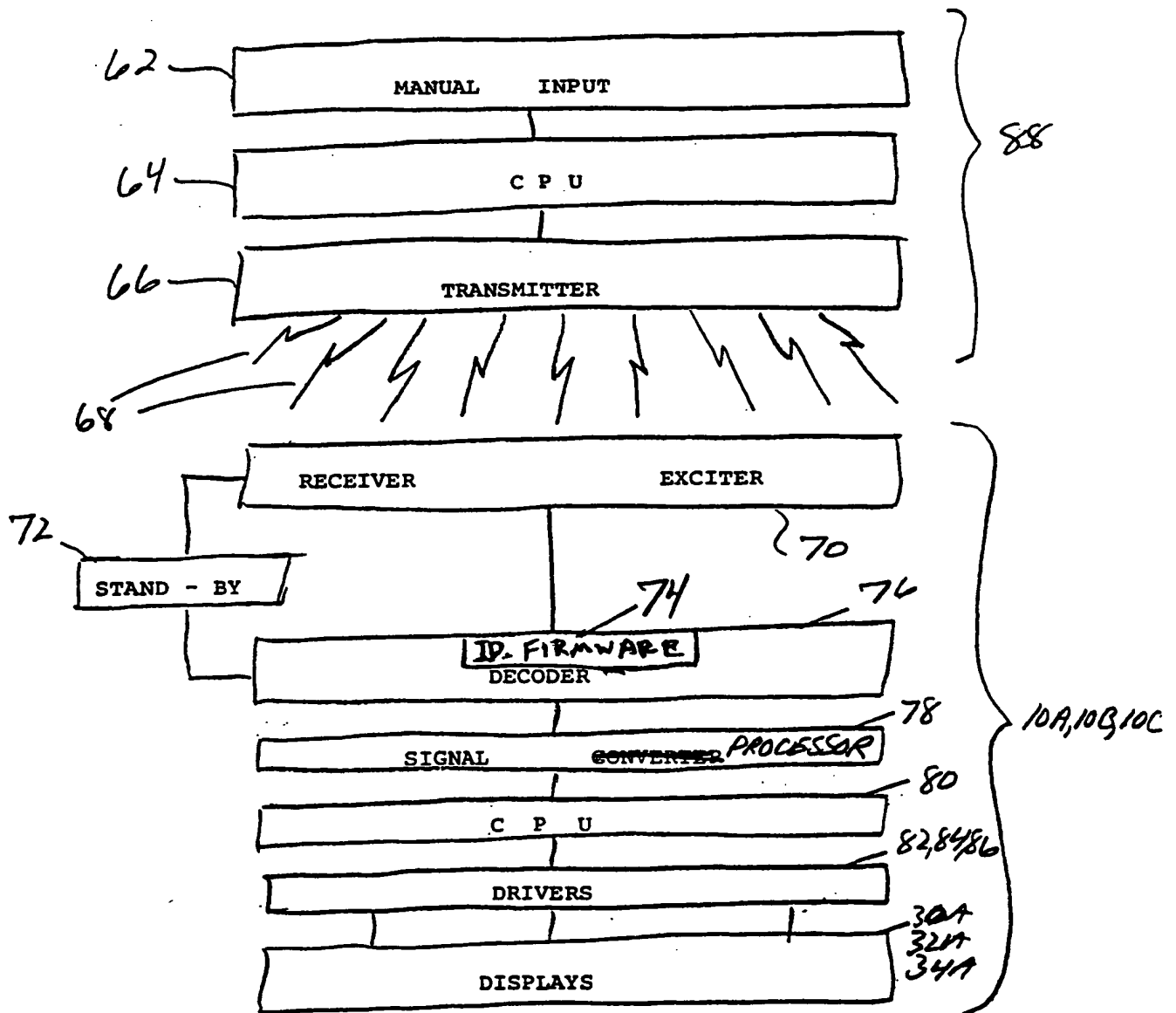
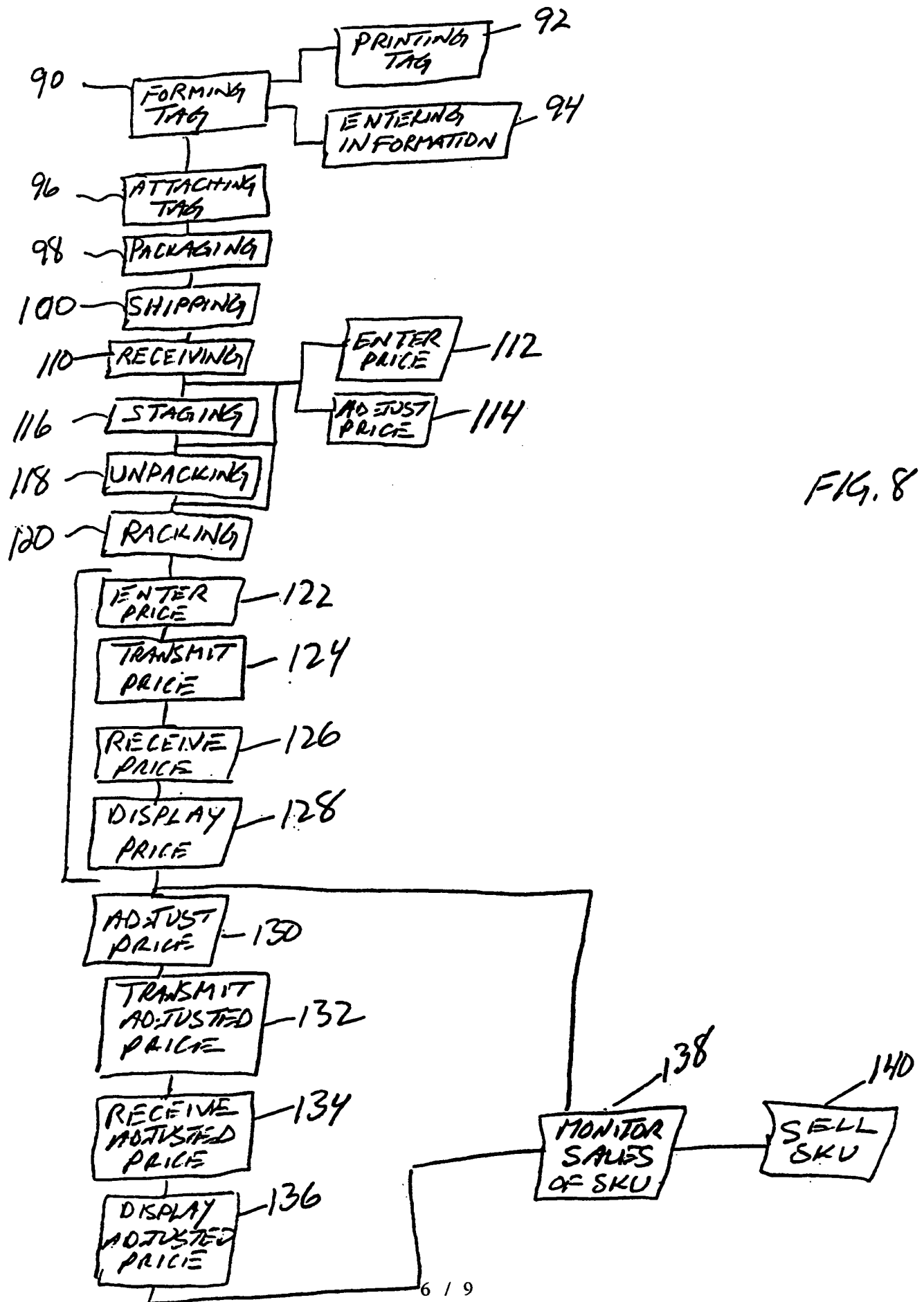


FIG. 7



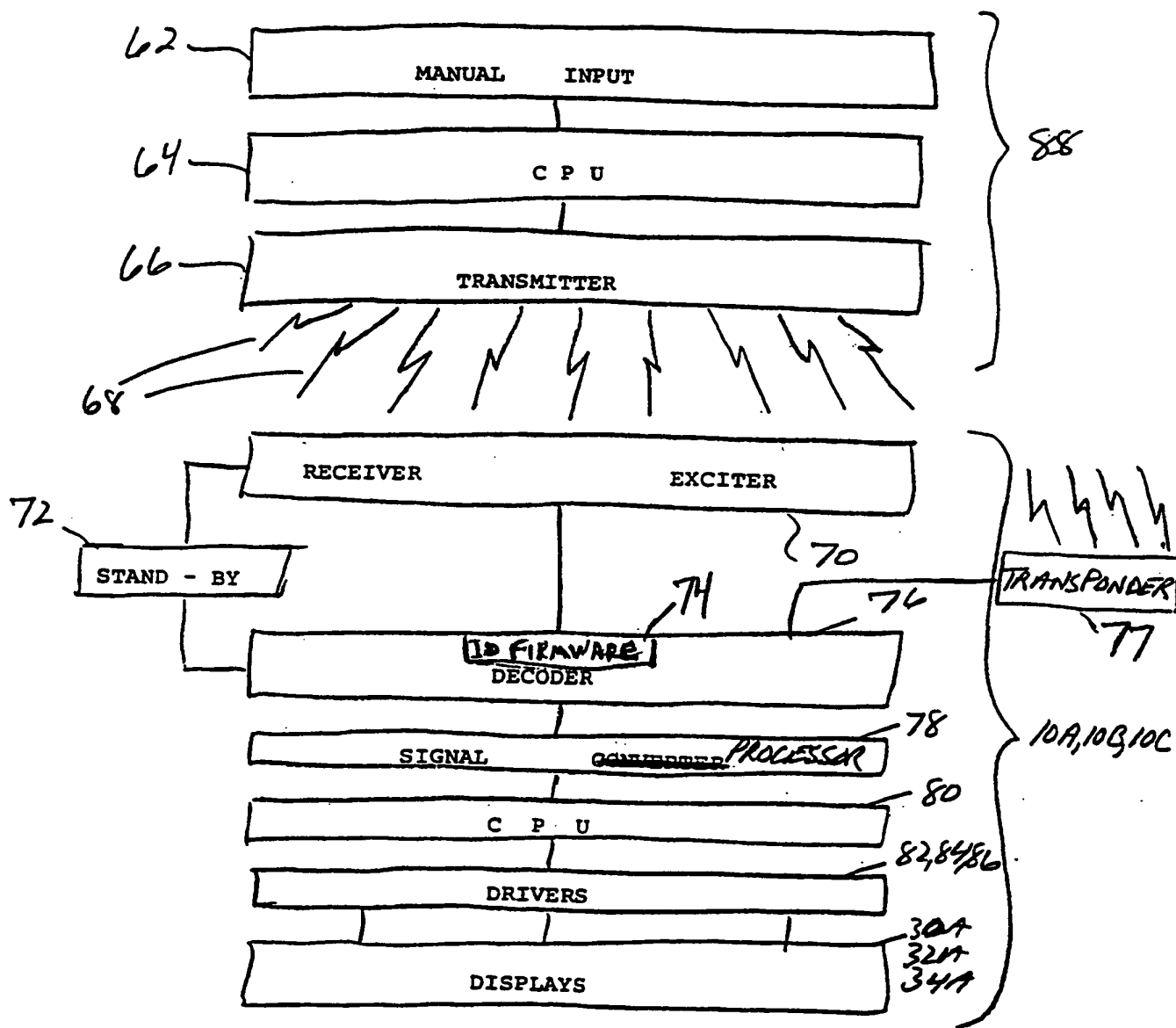
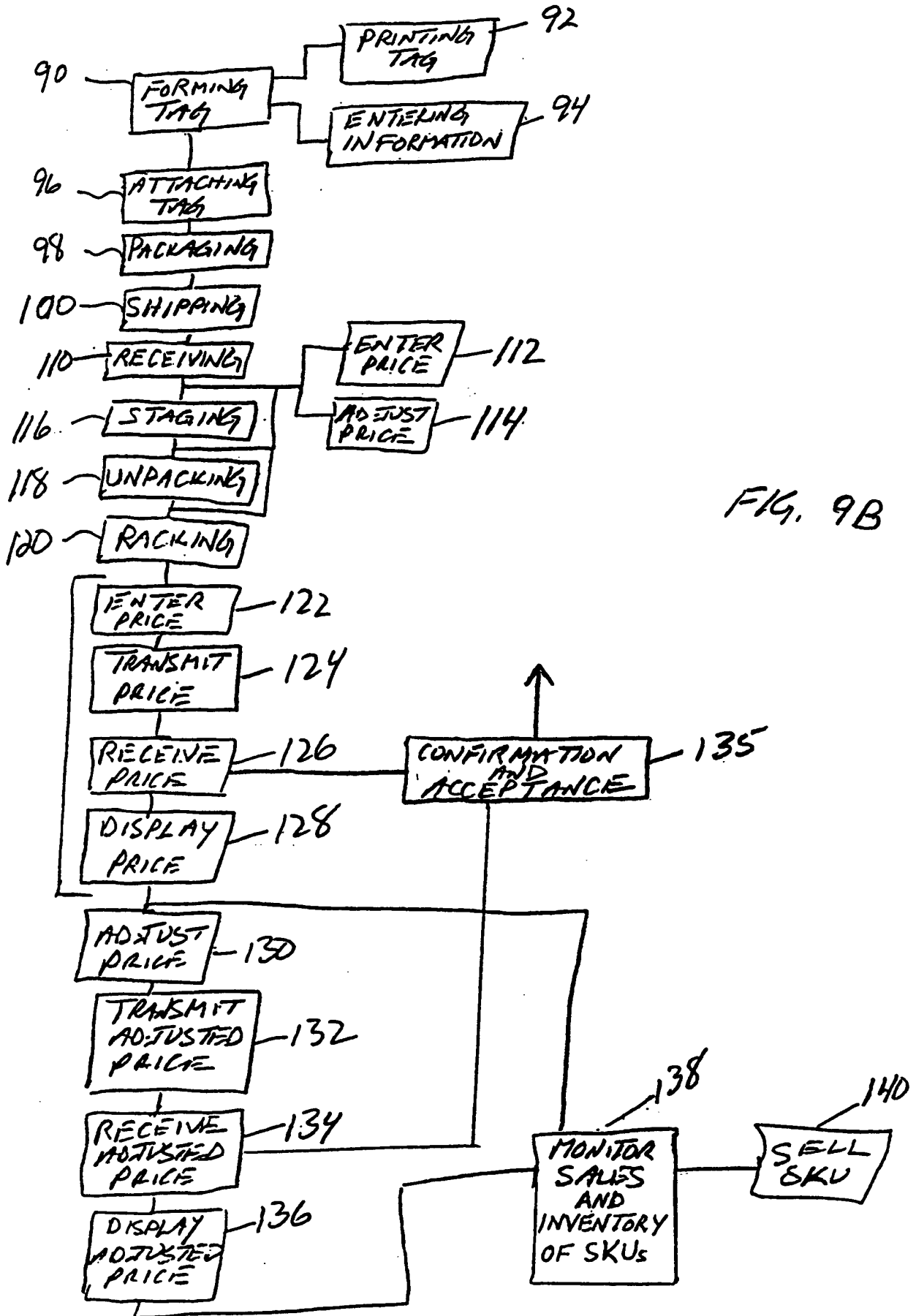
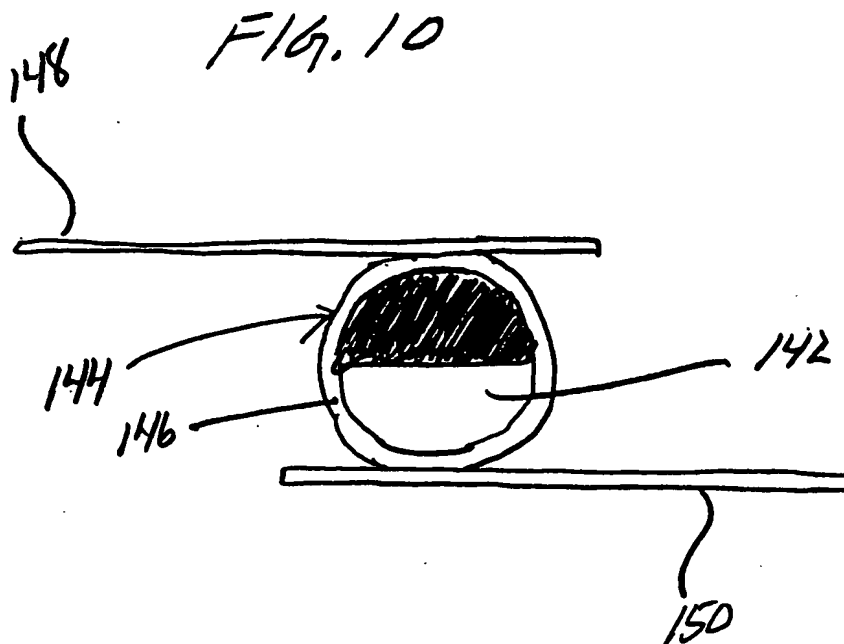


FIG. 9A





PRIOR ART

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